Crestron **CEN-RFGW-EX**
infiNET EX® Wireless Gateway
Operations & Installation Guide

CRESTRON®

Regulatory Compliance

As of the date of manufacture, the CEN-RFGW-EX has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.

Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions:
(1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

(Continued on following page)

Regulatory Compliance (Continued)

Industry Canada (IC) Compliance Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter, IC: 5683C-CWD6660, has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type: Dipole, Maximum permissible antenna gain: 2.5 dBi, Impedance: 50 Ohms

Industrie Canada (IC) Déclaration de conformité

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de license. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio , IC: 5683C-CWD6660, a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Type d'antenne: Dipole, Gain admissible maximal: 2.5 dBi, Impédance: 50 Ohms

To satisfy RF exposure requirements, this device and its antenna must operate with a separation distance of at least 20 centimeters from all persons and must not be colocated or operating in conjunction with any other antenna or transmitter.

The specific patents that cover Crestron products are listed at patents.crestron.com.

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Contents

infiNET EX Wireless Gateway: CEN-RFGW-EX 1

Introduction 1
- Features and Functions 1
- Specifications 4
- Physical Description 7

Setup 11
- Network Wiring 11
- Identity Code 12
- Installation 13
- Hardware Hookup 14

Uploading and Upgrading 15
- Establishing Communication 15
- Programs and Firmware 16
- Program Checks 17

Operation 18

Problem Solving 20
- Troubleshooting 20
- Check Network Wiring 22
- Reference Documents 24
- Further Inquiries 24
- Future Updates 24

Appendix A: The RF Spectrum 25

Appendix B: Optimum RF Reception Guidelines 26
- Minimize Interference 26
- Gateway Placement 26
- Antenna Orientation 27

Return and Warranty Policies 29
- Merchandise Returns / Repair Service 29
- Crestron Limited Warranty 29

infiNET EX Wireless Gateway: CEN-RFGW-EX

Introduction

The CEN-RFGW-EX is a 2-way RF gateway/transceiver designed to enable communications and management for a complete infiNET EX® wireless network of dimmers, keypads, remotes and other devices. The CEN-RFGW-EX links the infiNET EX network to a Crestron® control system via high speed Ethernet or Cresnet®. "Wi-Fi friendly" RF technology permits selection from 16 ISM* channels within the 2.4 GHz spectrum to minimize the possibility of interference with other RF equipment including 802.11 devices. Built-in Dynamic Frequency Allocation continuously monitors RF conditions, automatically selecting the clearest channel to prevent interference from neighboring networks, cordless phones and microwaves.

Features and Functions

- infiNET EX wireless gateway
- Ultra dependable mesh network technology
- Dynamic discovery for fast, easy setup
- "Wi-Fi friendly" channel selection for trouble free operation
- Dynamic Frequency Allocation prevents RF interference
- Built-in RF network diagnostics

(Continued on following page)

* Industrial, Scientific and Medical; refers to frequency range used for unlicensed communication applications, such as Wi-Fi.

Features and Functions

(Continued)

- Up to 150 feet (46 meters) range indoors, 250 feet (76 meters) outdoors[1]
- Supports up to 100 infiNET EX devices and five expanders[2]
- Supports up to six MLX-3 and MTX-3 handheld remotes[2]
- Cresnet or Ethernet control system interface
- Single wire Cresnet or PoE network powered
- EMerge Alliance® compatible

infiNET EX

Ultra-reliable infiNET EX wireless technology provides steadfast 2-way RF communications throughout a residential or commercial structure without the need for physical control wiring. Employing a 2.4 GHz mesh network topology, nearly every infiNET EX device on the network functions as an expander, passing command signals though to every other device within range, approximately 150 feet (46 meters) indoors, ensuring that every command reaches its intended destination without disruption. Each infiNET EX device that is added to the network effectively increases the range and stability of the entire network by providing multiple redundant signal paths.[1]

Easy Setup

Setting up a complete infiNET EX network is simple, utilizing dynamic discovery to locate and acquire each RF device automatically. At all times, the CEN-RFGW-EX monitors each device on the network, ignoring any other 2.4 GHz signals and reconfiguring the entire network automatically in response to new sources of interference and other changes in RF conditions.

1. Battery powered infiNET EX devices do not provide extender functionality and may have reduced RF range capabilities. Consult the specifications for each network device to confirm its actual wireless capabilities.
2. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 or MTX-3 remotes.

Up to 100 infiNET EX dimmers, switches, keypads, thermostats, remotes and other devices can be linked to a control system via a single CEN-RFGW-EX gateway.[1] Additional gateways may be installed to support more devices, with up to 16 gateways possible in a complete system (RF conditions allowing). Wireless expanders (model CLW-EXPEX or GLA-EXPEX, both sold separately) may be added wherever needed to extend the network by filling in gaps between devices.[2]

Handheld Remote Gateway

The CEN-RFGW-EX also provides a wireless gateway for Crestron MLX-3 and MTX-3 Handheld Remotes (both sold separately). Up to six remotes can be associated with a single gateway. [1] Each wireless connection is monitored continuously, diligently keeping track when any remote goes to sleep or wanders out of range, restoring communications seamlessly when it reappears on the network.

Single Wire Hookup

Wired communications between the CEN-RFGW-EX gateway and the control system can be via Cresnet or Ethernet, with power for the gateway delivered over the same Cresnet or Ethernet connection. Power over Ethernet (PoE) simply requires the presence of an 802.3af or 802.3at PoE power source. Crestron offers the PWE-4803RU PoE Injector, which connects in-line with the Ethernet cable, allowing for installation at any convenient location between the gateway and the network switch. The PWE-4803RU is capable of powering a single gateway and is available separately or packaged with the gateway as model CEN-RFGW-EX-PWE.

Crestron also offers Ethernet switches with built-in PoE (models CEN-SW-POE-5, CEN-SWPOE-16 and CEN-SWPOE-24, all sold separately), affording a complete high performance networking solution capable of providing PoE for multiple gateways and other PoE devices. Using an Ethernet switch with built-in PoE eliminates the need for separate PoE injectors.

1. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 or MTX-3 remotes.
2. Up to five CLW-EXPEX or GLA-EXPEX infiNET EX Expanders may be added to the network for extended range.

EMerge Alliance Registered

This device is EMerge Alliance registered and designed to work within a 24 Vdc room-level power distribution system. The EMerge Alliance is a not-for-profit open industry association leading the rapid adoption of safe DC power distribution in commercial buildings through the development of EMerge Alliance standards*. Crestron is a proud member and supporter of the Alliance. For more information about Crestron Solutions for EMerge Alliance Applications visit: www.crestron.com/emerge.

* Information regarding the EMerge Alliance can be found at www.emergealliance.org.

Specifications

Specifications for the CEN-RFGW-EX are listed in the following table.

CEN-RFGW-EX Specifications

SPECIFICATION	DETAILS
Wireless	
RF Transceiver	infiNET EX 2-way RF, 2.4 GHz ISM Channels 11-26 (2400 to 2483.5 MHz), default channel 15; IEEE 802.15.4 compliant
Range (typical)	150 feet (46 meters) indoor, 250 feet (76 meters) outdoor, to nearest mesh network device(s); subject to site-specific conditions and individual device capabilities[1] Maximum 100 devices and five expanders per gateway[2, 3]
Ethernet	10/100 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, DHCP, IEEE 802.3af and 802.3at Type 1 compliant Unit ships with DHCP enabled

(Continued on following page)

CEN-RFGW-EX Specifications (Continued)

SPECIFICATION	DETAILS
Power Requirements[4]	
Power over Ethernet	IEEE 802.3af (802.3at Type 1) Class 1 PoE powered device
Cresnet Power Usage	2 watts (0.09 amps @ 24 Vdc)
Default Net ID	2F
Minimum Firmware	Version 2.001.0003 or later
Environmental	
Temperature	41º to 104º F (5º to 40º C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	7 Btu/h
Enclosure	
Construction	Aluminum with polycarbonate label overlay and (4) integral mounting flanges
Mounting	Freestanding, surface mount or attach to a single rack rail
Dimensions (without antenna)	
Height	6.41 in (163 mm)
Width	3.91 in (100 mm)
Depth	1.43 in (37 mm)
Weight	14 oz (373g)
Available Models	
CEN-RFGW-EX	infiNET EX Wireless Gateway
CEN-RFGW-EX-PWE	infiNET EX Wireless Gateway with PoE Injector

(Continued on following page)

CEN-RFGW-EX Specifications (Continued)

SPECIFICATION	DETAILS
Available Accessories	
ANT-EXT	Antenna Extender
CEN-SW-POE-5	5-Port PoE Switch
CEN-SWPOE-16	16-Port Managed PoE Switch
CEN-SWPOE-24	24-Port Managed PoE Switch
CLW-EXPEX	InfiNET EX Wireless Expander
GLA-EXPEX	Crestron Green Light® Wireless Expander for infiNET EX Networks
PWE-4803RU	PoE Injector (included with model CEN-RFGW-EX-PWE)

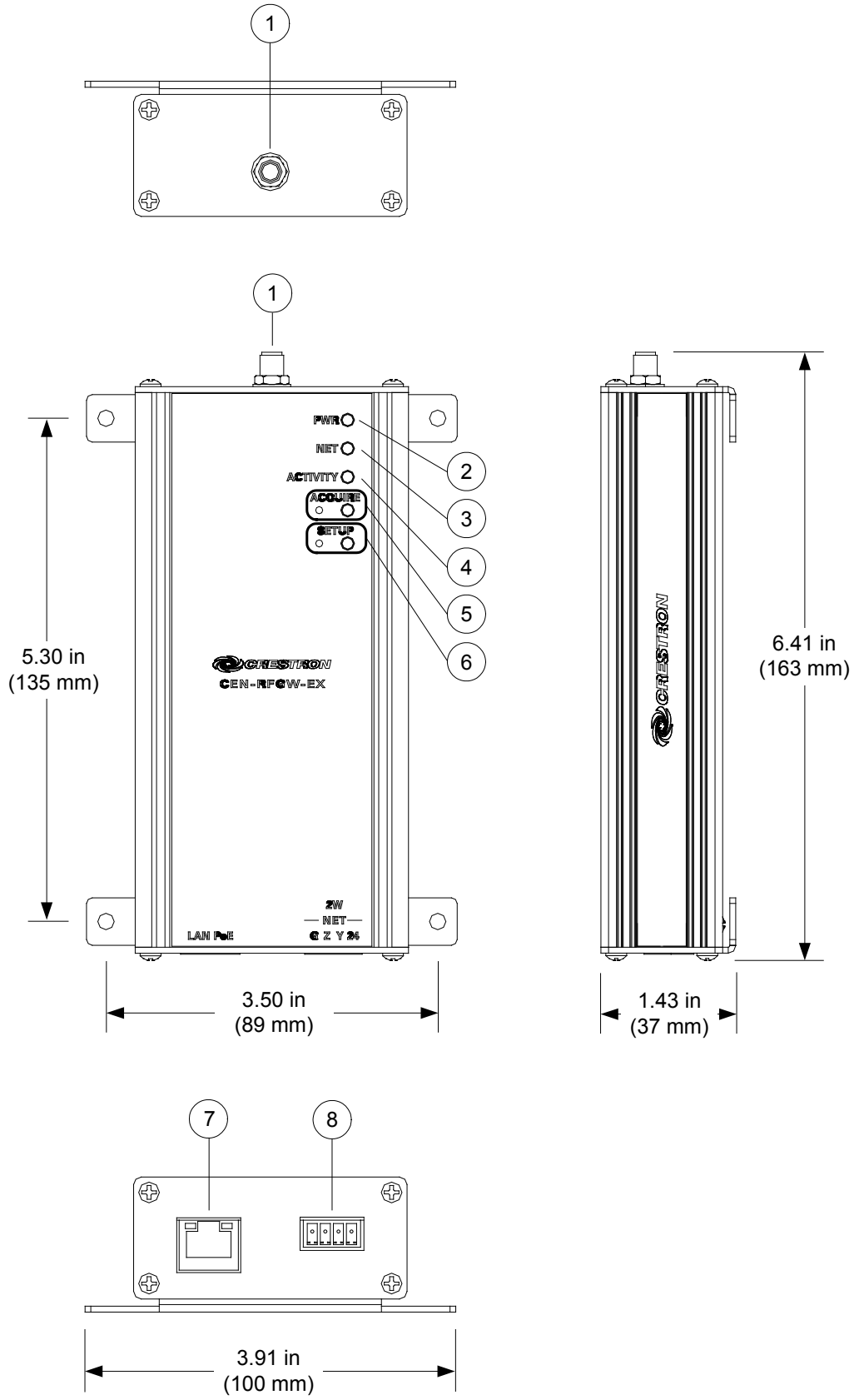
1. Battery powered infiNET EX devices do not provide extender functionality and may have reduced RF range capabilities. Consult the specifications for each network device to confirm its actual wireless capabilities.
2. A single infiNET EX gateway supports up to 100 wireless network devices inclusive of up to six MLX-3 or MTX-3 remotes.
3. Up to five CLW-EXPEX or GLA-EXPEX infiNET EX Expanders may be added to the network for extended range.
4. May be powered by PoE or Cresnet network power, not both.

Physical Description

This section provides information on the connections, controls and indicators available on the CEN-RFGW-EX.

CEN-RFGW-EX Physical View

CEN-RFGW-EX Overall Dimensions (Top, Front, Side and Bottom Views)

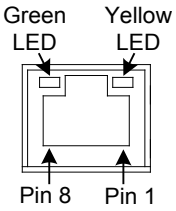
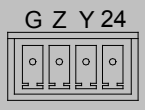


Connectors, Controls & Indicators

#	CONNECTORS[1], CONTROLS & INDICATORS	DESCRIPTION
1	ANTENNA	(1) Connection for supplied antenna
2	PWR LED	(1) Green LED, indicates operating power supplied from Cresnet network or PoE
3	NET LED	(1) Yellow LED, indicates communication with the Cresnet system
4	ACTIVITY LED	(1) Red LED, indicates wireless communications
5	ACQUIRE (Button and LED)	(1) Recessed push button with red LED, used to set up connections with wireless devices
6	SETUP (Button and LED)	(1) Recessed push button with red LED, used to set up connection with the control system via Cresnet or Ethernet

(Continued on following page)

Connectors, Controls & Indicators (Continued)

<table>
<tr><th>#</th><th>CONNECTORS[1], CONTROLS & INDICATORS</th><th>DESCRIPTION</th></tr>
<tr><td>7</td><td>LAN PoE[2, 3]
 
</td><td>(1) 8-wire RJ-45 female, with two LED indicators;
10BASE-T/100BASE-TX Ethernet port;
Power over Ethernet compliant;
Green LED indicates link status;
Yellow LED indicates Ethernet activity
<table>
<tr><th>PIN</th><th>SIGNAL</th><th>PIN</th><th>SIGNAL</th></tr>
<tr><td>1</td><td>TX +</td><td>5</td><td>N/C</td></tr>
<tr><td>2</td><td>TX -</td><td>6</td><td>RC -</td></tr>
<tr><td>3</td><td>RC +</td><td>7</td><td>N/C</td></tr>
<tr><td>4</td><td>N/C</td><td>8</td><td>N/C</td></tr>
</table></td></tr>
<tr><td>8</td><td>NET[2]
 
</td><td>(1) 4-pin 3.5 mm detachable terminal block;
Cresnet slave port, connects to Cresnet control network
24: Power (24 Volts DC)
Y: Data
Z: Data
G: Ground</td></tr>
</table>

1. An interface connector for the **NET** port is provided with the unit.
2. Power should be supplied through either the **LAN PoE** port or the **NET** port but not both.
3. The pin out table indicates signal connections. DC power applied by Ethernet power sourcing equipment (PSE) can connect to either signal pins or N/C pins.

Setup

Network Wiring

When wiring the Cresnet network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

CAUTION: Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (www.crestron.com/calculators).

For Cresnet networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to "Check Network Wiring" on page 22.

The CEN-RFGW-EX can also use high-speed Ethernet for communications between the device and a control system, computer, media server and other IP-based devices.

For general information on connecting Ethernet devices in a Crestron system, refer to the latest version of the Crestron e-Control® Reference Guide (Doc. 6052), which is available from the Crestron Web site (www.crestron.com/manuals).

Identity Code

Net ID

The Net ID of the CEN-RFGW-EX has been factory set to **2F**. The Net IDs of multiple CEN-RFGW-EX devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via Crestron Toolbox™ (refer to "Establishing Communication" on page 15).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the Crestron Studio™ or SIMPL Windows program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

IP ID

The IP ID is set within the CEN-RFGW-EX's IP table using Crestron Toolbox. For information on setting an IP table, refer to the Crestron Toolbox help file. The IP IDs of multiple CEN-RFGW-EX devices in the same system must be unique.

When setting the IP ID, consider the following:

- The IP ID of each unit must match an IP ID specified in the Crestron Studio or SIMPL Windows program.
- Each device using IP to communicate with a control system must have a unique IP ID.

Installation

Ventilation

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consider using forced air ventilation or incrementing the spacing between units to reduce overheating. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

Placement Tips

When installing a CEN-RFGW-EX near another CEN-RFGW-EX, for optimum performance, keep the following in mind:

- Do not place multiple gateways on the same channel. Refer to "Appendix A: The RF Spectrum" on page 25 for details.
- Gateways on adjacent channels should be at least 12 feet (3.7 meters) apart.
- Gateways on non-adjacent channels should be at least three feet (0.9 meters) apart.

When installing a CEN-RFGW-EX near a Wi-Fi access point, for optimum performance, keep the following in mind:

- Gateways on RF channels adjacent to operating Wi-Fi channels should be placed at least 12 feet (3.7 meters) from the nearest Wi-Fi access point.
- Gateways on RF channels that are non-adjacent to Wi-Fi channels should be located at least six feet (1.8 meters) from the nearest Wi-Fi access point.

For more information on RF channels and their interaction with the Wi-Fi spectrum, refer to "Appendix A: The RF Spectrum" on page 25. For additional information on optimal gateway placement, refer to "Appendix B: Optimum RF Reception Guidelines" on page 26.

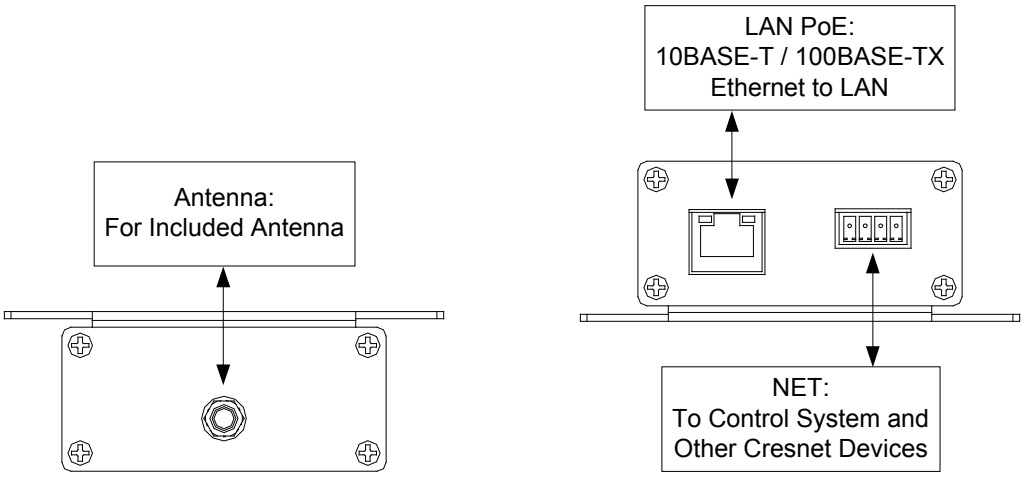
Hardware Hookup

Make the necessary connections as called out in the illustrations that follow this paragraph. Refer to "Network Wiring" on page 11 before attaching the 4-position terminal block connector. Apply power after all connections have been made.

NOTE: Power should be supplied through either the **LAN PoE** port or the **NET** port but not both.

When making connections to the CEN-RFGW-EX, use Crestron power supplies for Crestron equipment.

Hardware Connections for the CEN-RFGW-EX (Top and Bottom Views)



NOTE: Antenna must be attached directly to the antenna connector. It can be extended with an optional ANT-EXT-5 or ANT-EXT-10 Antenna Extender (both sold separately).

NOTE: Although both the **LAN PoE** and **NET** ports can be used for configuration, there can only be one control connection to the control system.

Uploading and Upgrading

Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs or firmware) can be transferred to the control system (or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.

NOTE: Crestron software and any files on the Web site are for authorized Crestron dealers and Crestron Service Providers (CSPs) only. New users must register to obtain access to certain areas of the site (including the FTP site).

Establishing Communication

Use Crestron Toolbox for communicating with the CEN-RFGW-EX; refer to the Crestron Toolbox help file for details. There are two methods of communication: indirect and TCP/IP.

Indirect

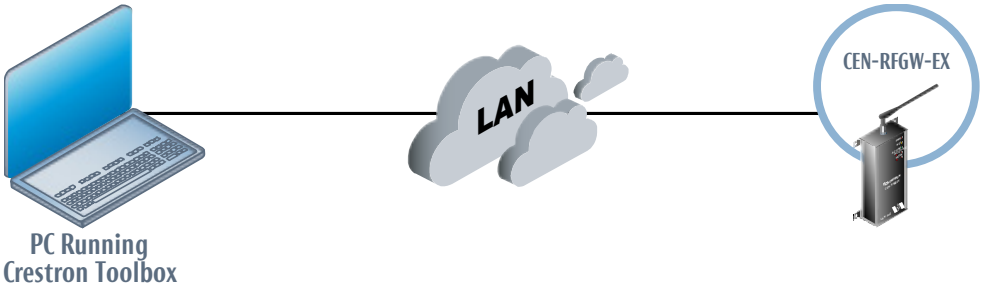
Indirect Communication

CEN-RFGW-EX connects to control system via Cresnet:

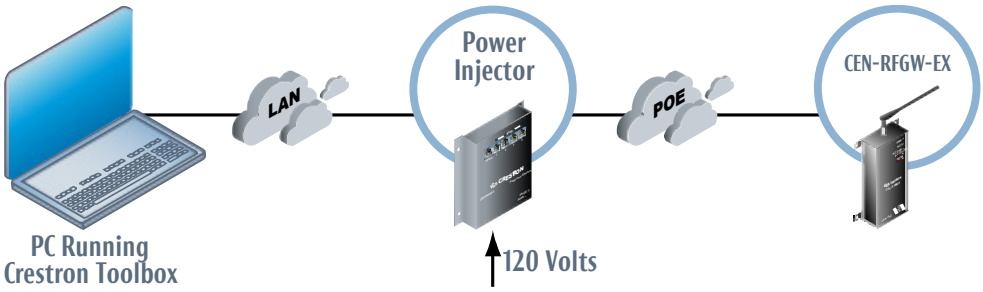
1. Click Tools | System Info.
2. Click the icon.
3. For *Connection Type*, select *Cresnet ID*. In the *Through* drop-down menu, select the control system.
4. Click **OK**. Communications are confirmed when the device information is displayed.

TCP/IP

Ethernet Communication



Ethernet Communication (Without Hub or Router)



The CEN-RFGW-EX connects to PC via Ethernet:

1. Use the Device Discovery Tool (click the icon) in Crestron Toolbox to detect all Ethernet devices on the network and their IP configuration. The tool is available in Toolbox version 1.15.143 or later.
2. Click on the CEN-ERFGW-POE to display information about the device.

Programs and Firmware

Program or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron Web site as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file, VT Pro-e® help file or the Crestron Toolbox help file.

Crestron Studio / SIMPL Windows

If a Crestron Studio (or SIMPL Windows) program is provided, it can be uploaded to the control system using Crestron Studio (or SIMPL Windows) or Crestron Toolbox.

Crestron Studio / VT Pro-e

Upload the Crestron Studio (or VT Pro-e) file for the RF device using Crestron Studio (or VT Pro-e) or Crestron Toolbox.

Firmware

Check the Crestron Web site to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade CEN-RFGW-EX firmware via Crestron Toolbox.

1. Establish communication with the CEN-RFGW-EX and display the "System Info" window.
2. Select **Functions | Firmware…** to upgrade the CEN-RFGW-EX firmware.

NOTE: Minimum firmware version is 2.001.0003 or later.

Program Checks

Actions that can be performed on the CEN-RFGW-EX vary depending on whether it is connected via Cresnet or Ethernet.

Cresnet Connections

For Cresnet connections, using Crestron Toolbox, display the network device tree (**Tools | Network Device Tree View**) to show all network devices connected to the control system. Right-click on the CEN-RFGW-EX to display actions that can be performed on the CEN-RFGW-EX.

Ethernet Connections

For Ethernet connections, display the "System Info window (**Tools | System Info**) and select the **Functions** menu to display actions that can be performed on the CEN-RFGW-EX.

Be sure to use Crestron Toolbox to create the CEN-RFGW-EX IP table.

1. Select **Functions | IP Table Setup**.
2. Add, modify or delete entries in the IP table. The CEN-RFGW-EX can have only one IP table entry.
3. A defined IP table can be saved to a file or sent to the device.

Edit the control system's IP table to include an entry for the CEN-RFGW-EX. The entry should list the CEN-RFGW-EX's IP ID (specified on the CEN-RFGW-EX's IP table) and the internal gateway IP address 127.0.0.1.

NOTE: Only one IP table entry is allowed. The unit can talk to only one processor over IP.

Operation

NOTE: MLX-2 devices cannot be used on the same gateway as other non-MLX-2 devices.

Operating Channel

The operating channel of the CEN-RFGW-EX must be set prior to operation using Crestron Toolbox. The CEN-RFGW-EX can operate on one of 16 channels. The CEN-RFGW-EX can operate on a fixed channel that is set by the installer. The default RF channel is 15.

For optimum performance when installing a CEN-RFGW-EX in a Wi-Fi environment, do not set the CEN-RFGW-EX to a channel within a Wi-Fi channel band. Crestron recommends channel 15 or channel 20.

- Gateway channels 11-14 are within Wi-Fi channel 1 band.
- Gateway channel 15 is adjacent to Wi-Fi channels 1 and 6.
- Gateway channels 16-19 are within Wi-Fi channel 6 band.
- Gateway channel 20 is adjacent to Wi-Fi channels 6 and 11.
- Gateway channels 21-24 are within Wi-Fi channel 11 band.
- Gateway channel 25 is adjacent to Wi-Fi channel 11.
- Gateway channel 26 is neither within or adjacent to any Wi-Fi band.

For detailed information on RF channels, refer to "Appendix A: The RF Spectrum" on page 25.

After establishing communication with the CEN-RFGW-EX (refer to "Establishing Communication" on page 15), use Crestron Toolbox to set the operating channel.

RF Channel

Each gateway can communicate with up to 100 infiNET EX devices on the same channel. Each device must have an RF channel assignment that matches the RF channel assignment of the gateway.

There are 16 possible channels ranging from 11 to 26.

Setting RF channel is done from a PC via Crestron Toolbox. To access this in Toolbox, select **Functions | infiNET EX Gateway…**. Refer to the Toolbox Help file and search for "infiNET EX Gateway" for more details.

Acquiring the infNET EX device

Crestron infiNET EX devices can communicate with a CEN-RFGW-EX only if they have been acquired by that CEN-RFGW-EX. *Acquire* mode can be activated from Crestron Toolbox (recommended) or with the **ACQUIRE** button on the CEN-RFGW-EX.

NOTE: To access this in Toolbox, select **Functions | infiNET EX Gateway…**. Refer to the Toolbox Help file and search for "infiNET EX Gateway" for more details.

NOTE: Use Toolbox to set the RF channel before starting the acquire process. The default RF channel is 15. If the RF channel on a device is changed, it must be acquired again.

NOTE: *Acquire* mode can be activated approximately 15 seconds after applying power to the CEN-RFGW-EX.

NOTE: In an environment with multiple gateways, only one gateway should be in *Acquire* mode at a time.

NOTE: The CEN-RFGW-EX must be placed in *Acquire* mode before an infiNET EX device is placed in *Acquire* mode.

To acquire an infiNET EX device via the **ACQUIRE** button on the CEN-RFGW-EX:

1. Press **ACQUIRE** on the CEN-RFGW-EX to enter *Acquire* mode. The accompanying LED illuminates, indicating the unit is ready to link to infiNET EX devices.

   NOTE: *Acquire* mode automatically deactivates after one hour. This default timeout period can be changed from Toolbox.

2. Bring the infiNET EX device within range of the gateway and place it in *Acquire* mode as described in its manual. The device is automatically acquired by the gateway within two minutes after it enters *Acquire* mode.
3. Repeat step 2 for each infiNET EX device to be acquired.
4. Press **ACQUIRE** on the CEN-RFGW-EX to exit *Acquire* mode. The LED turns off.

Problem Solving

Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

CEN-RFGW-EX Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
PWR LED does not illuminate.	CEN-RFGW-EX is not receiving sufficient Cresnet power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
	CEN-RFGW-EX is not receiving sufficient Ethernet power.	Verify that appropriate Ethernet power sourcing equipment (PSE) Power over Ethernet indicator is ON.
NET LED does not illuminate.	CEN-RFGW-EX Net ID is not set to match the Net ID of the SIMPL program.	In Crestron Toolbox, check **Functions | CresnetID** to verify Net ID. Verify Net ID in SIMPL Windows program.
NET LED is on but unit does not communicate with infiNET EX device.	CEN-RFGW-EX is not communicating with network.	Check network cabling for solid connections and correct pinouts.
	CEN-RFGW-EX Net ID is not unique; two or more units share the same Net ID.	Verify the Net IDs for all network devices are unique when multiple devices are used.

(Continued on following page)

CEN-RFGW-EX Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
NET LED is on but unit does not communicate with infiNET EX device. (Continued)	infiNET EX device is set to wrong RF channel.	Refer to the "Setup" section of the guide for the device to verify that its RF channel is set to match the CEN-RFGW-EX channel ID.
	infiNET EX device RF ID does not match the RF ID of the SIMPL program.	Use Crestron Toolbox to poll the network. Check the RF ID for the device, then refer to the "Setup" section of the guide for the device to set its RF ID to match the RF ID in the SIMPL program.
	infiNET EX device is not functioning correctly.	Refer to the "Problem Solving" section of the guide for the device.
Intermittent response from CEN-RFGW-EX during communication with device.	CEN-RFGW-EX is in vicinity of metal.	Verify that large amount of metal is not in vicinity of transmission.
	infiNET EX device is not functioning correctly.	Refer to the "Problem Solving" section of the guide for the device.
	infiNET EX device is out of range.	Position the device within operating range or relocate CEN-RFGW-EX. Refer to "Specifications" on page 4 for details.

(Continued on following page)

CEN-RFGW-EX Troubleshooting (Continued)

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
CEN-RFGW-EX is not shown on Network Device Tree when polling through Toolbox. Other devices are reported.	Network wiring is incorrect.	Check network cabling for solid connections and correct pinouts.
	CEN-RFGW-EX is damaged.	Contact a Crestron customer service representative.
Multiple infiNET EX devices only operate one at a time.	Multiple infiNET EX devices are set to the same RF ID.	Use Crestron Toolbox to poll the network. Check the RF ID for the device, then refer to the "Setup" section of the guide for the device to set its RF ID to match the RF ID in the SIMPL program.

Check Network Wiring

Use the Right Wire

In order to ensure optimum performance over the full range of the installation topology, use Crestron Certified Wire only. Failure to do so may incur additional charges if support is required to identify performance deficiencies because of using improper wire.

Calculate Power

CAUTION: Use only Crestron power supplies for Crestron equipment. Failure to do so could cause equipment damage or void the Crestron warranty.

CAUTION: Provide sufficient power to the system. Insufficient power can lead to unpredictable results or damage to the equipment. Please use the Crestron Power Calculator to help calculate how much power is needed for the system (www.crestron.com/calculators).

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be

connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy chained on the run, the Cresnet power usage of each network unit to be daisy-chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is run from a Crestron system power supply network port, the Cresnet power usage of that unit is the Cresnet power usage of the entire run. The wire gauge and the Cresnet power usage of the run should be used in the following equation to calculate the cable length value on the equation's left side.

Cable Length Equation

$$L < \frac{40{,}000}{R \times P}$$

Where: L = Length of run (or chain) in feet
R = 6 Ohms (Crestron Certified Wire: 18 AWG (0.75 mm^2))
or 1.6 Ohms (Cresnet HP: 12 AWG (4 mm^2))
P = Cresnet power usage of entire run (or chain)

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

NOTE: All Crestron certified Cresnet wiring must consist of two twisted pairs. One twisted pair is the **24** and **G** pair and the other twisted pair is the **Y** and **Z** pair.

Strip and Tin Wire

When daisy chaining Cresnet units, strip the ends of the wires carefully to avoid nicking the conductors. Twist together the ends of the wires that share a pin on the network connector and tin the twisted connection. Apply solder only to the ends of the twisted wires. Avoid tinning too far up the wires or the end becomes brittle. Insert the tinned connection into the Cresnet connector and tighten the retaining screw. Repeat the procedure for the other three conductors.

Add Hubs

Use of a Cresnet Hub/Repeater (CNXHUB) is advised whenever the number of Cresnet devices on a network exceeds 20 or when the combined total length of Cresnet cable exceeds 3000 feet (914 meters).

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron Web site (www.crestron.com/manuals).

List of Related Reference Documents

DOCUMENT TITLE
2-Series Control Systems Reference Guide
Crestron e-Control Reference Guide

Further Inquiries

To locate specific information or resolve questions after reviewing this guide, contact Crestron's True Blue Support at 1-888-CRESTRON [1-888-273-7876] or refer to the listing of Crestron worldwide offices on the Crestron Web site (www.crestron.com/offices) for assistance within a particular geographic region.

To post a question about Crestron products, log onto the Online Help section of the Crestron Web site (www.crestron.com/onlinehelp). First-time users must establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the CEN-RFGW-EX, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

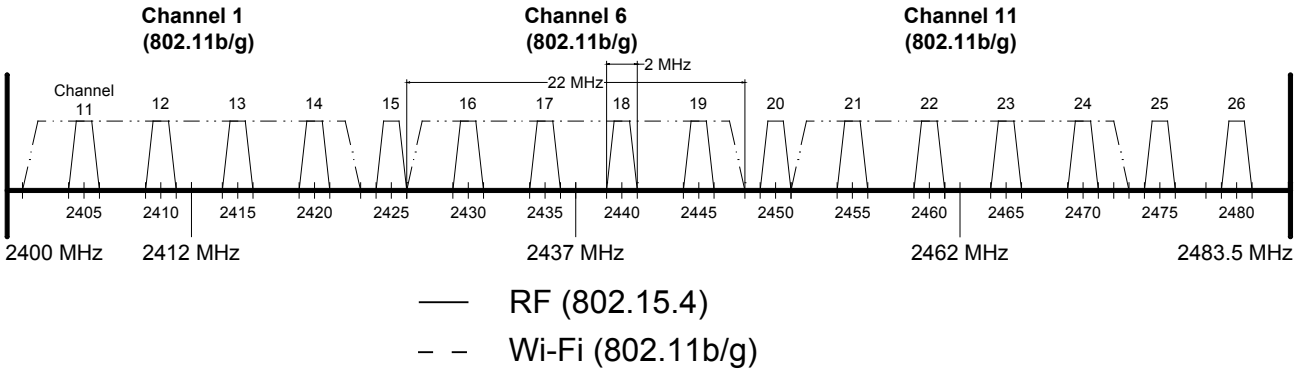
Check the Crestron Web site periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

Appendix A: The RF Spectrum

Crestron's RF network provides 16 RF channels in the 2.4GHz ISM* band, specifically IEEE 802.15.4 channels 11 through 26. The 16 channels define the frequencies at which the RF device communicates.

RF devices on different channels do not communicate or interfere with each other. However, since some of the channels are in the 2.4GHz ISM band (as shown in the following diagram), interference can occur with other devices using this band, such as 802.11b/g Wi-Fi devices, Crestron infiNET™ devices or Zigbee devices, although the differing protocols do not allow a link to be established or data to be transferred. Wireless 2.4GHz telephones and microwave ovens may also cause interference with the network.

IEEE 802.15.4 channel selection (2400 MHz PHY)



* Industrial, Scientific and Medical; refers to frequency range used for unlicensed communication applications, such as Wi-Fi.

Appendix B: Optimum RF Reception Guidelines

Many factors can affect the reliability of RF communication between an RF gateway and an RF device. While an effort has been made to determine operating specifications, some specifications are not constant. RF Communication can be limited by several factors including but not limited to EMI (electromagnetic interference), intervening objects, antenna orientation and receiver placement. To obtain maximum reliability and performance, some basic rules for installing RF transceivers are listed below.

Minimize Interference

RF reception range can be hindered by spurious EMI noise that may interfere with or mask the desired frequency, thereby reducing useable range. EMI is generated by any electrical device at various RF noise levels depending on the device. Sources of EMI include computers, video equipment, digital processors, lighting dimmers, lighting ballasts, motors or any large AC source. Every effort should be made to separate any RF transceiver from these sources of RF noise including Audio Visual equipment in racks. If a gateway must be installed in an equipment rack, make sure there is ample separation between the equipment and the gateway.

Gateway Placement

Optimum reception for any RF transceiver is obtained by installing the gateway transceiver in an open area or shelf with a clear line of sight (no obstructions between gateway and receiver). Crestron recommends that the gateway is at least five to six feet high for best results. Avoid placing transceivers or transmitters at a low height or on the ground. Placing RF equipment near metal objects, walls, corners or metal enclosures compromises RF propagation and reception. Try to avoid installing gateways in equipment racks, service rooms, electrical closets or in rooms other than that which the touch screen is located.

Antenna Orientation

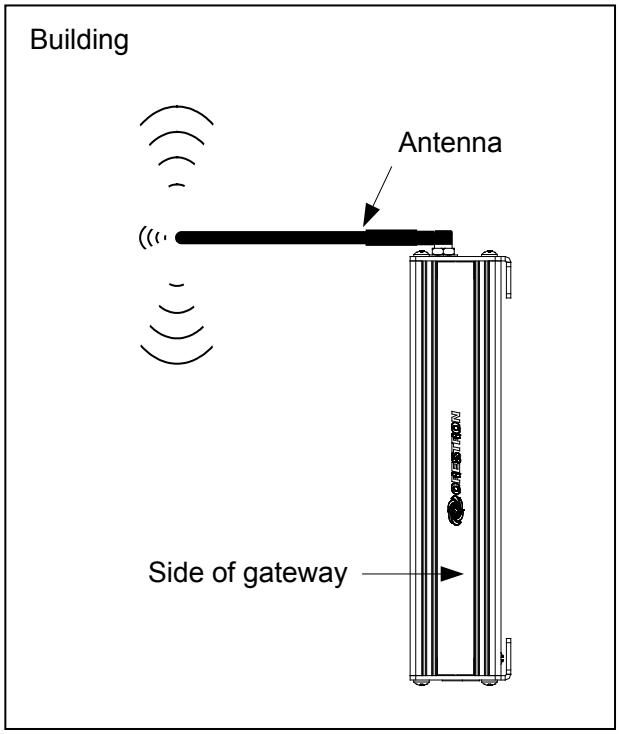
The antenna orientation on Crestron gateways has considerable effect on range and reliability. The best orientation is unique to each installation. There are three possible antenna orientations:

- Point the antenna horizontally (parallel to the ground)
- Point the antenna vertically.
- Point the antenna at a right angle to the gateway.

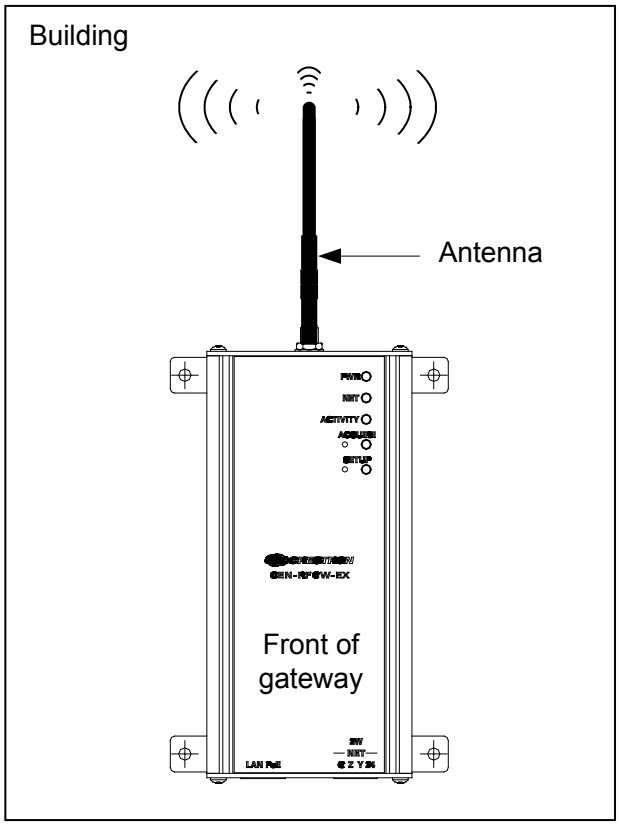
Never point the antenna downward as this decreases range and reliability. Refer to illustration below and those on the following page for examples of the different antenna orientations.

NOTE: RF propagation is best from the sides of the antenna.

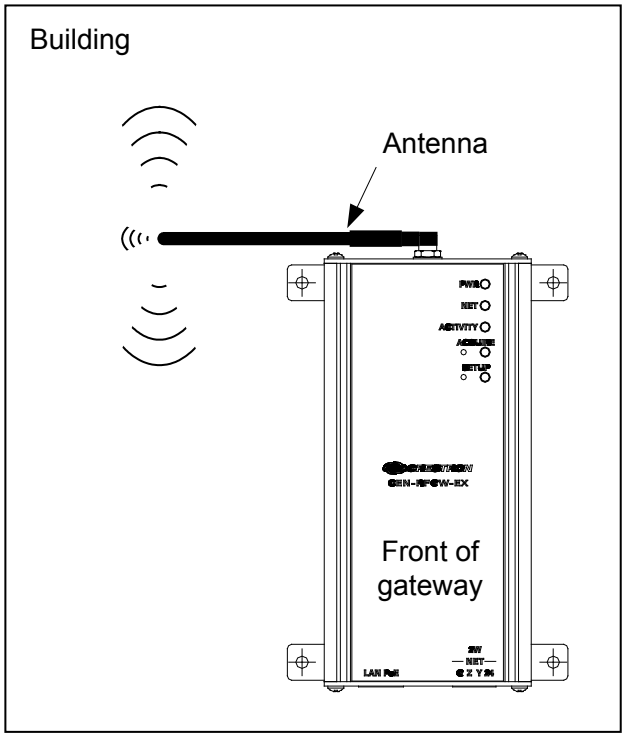
Horizontal Orientation



Vertical Orientation



Right Angle Orientation



Return and Warranty Policies

Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange or service without prior authorization from Crestron. To obtain warranty service for Crestron products, contact an authorized Crestron dealer. Only authorized Crestron dealers may contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number and return address.
2. Products may be returned for credit, exchange or service with a Crestron Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to Crestron, 6 Volvo Drive, Rockleigh, N.J. or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. Crestron reserves the right in its sole and absolute discretion to charge a 15% restocking fee plus shipping costs on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by Crestron, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

Crestron Limited Warranty

Crestron Electronics, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from Crestron, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touch screen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from Crestron or an authorized Crestron dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

Crestron shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended or if it has been subjected to misuse, accidental damage, modification or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall Crestron be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. Crestron is not liable for any claim made by a third party or made by the purchaser for a third party.

Crestron shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, Crestron makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.

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